STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Electromagnetic compatibility**		Code **1010312321010322623**
Field of study **Electrical Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 2**
Elective path/specialty **Electric Power Systems**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**	
No. of hours Lecture: **15** Classes: **-** Laboratory: **15** Project/seminars: **-**		No. of credits **2**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

prof. dr hab. inż. Wojciech Machczyński
email: wojciech.machczynski@put.poznan.pl
tel. 616652383
Wydział Elektryczny
ul. Piotrowo 3A, 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Fundamentals of electrical engineering, electromagnetism, physics and mathematics.
2	**Skills**	Calculation of electrical circuits and electromagnetic fields distributions.
3	**Social competencies**	Ability to work in a team and to improving their own competence.

Assumptions and objectives of the course:

Basic knowledge of electromagnetic compatibility problems and EMC simulation methods.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Student will be able to identify the sources and characteristics of electromagnetic disturbances, disturbances spreading mechanisms and their impact on the equipment and systems and identify the impact of electromagnetic fields on the technical and biological environment. - [K_W05++, K_W19+]

2. Student will be able to explain the causes of disorders of electrical and propose measures and equipment that limit their impact. - [K_W11++]]

Skills:

1. Able to analyze the causes, the effects of electromagnetic (e-m) interference, define the source and parameters of e-m disturbances, investigate mechanisms of the spread of the disorders and their effects on devices and systems, calculate the impact of e-m fields on biological technical environment. - [K_U01+, K_U02++]

2. Student will be able to estimate emissions and electrical resistance to electromagnetic interference, restriction measures the effects of excess emissions and increase resistance to electromagnetic compatibility. - [K_U03+, K_U18+]

Social competencies:

1. Student will gain the following skills to think and act creatively in the field of EMC, is capable of intelligible communication to the public purposes of EMC. - [K_K01+, K_K02++]

Assessment methods of study outcomes

Lectures:

- assess the knowledge and skills demonstrated by the successful completion of a written problem.

Laboratory:

- test and favoring knowledge necessary for the accomplishment of problems in the area of laboratory tasks,
- continuous evaluation for each course - rewarding gain skills they met the principles and methods
- assessment of knowledge and skills related to the implementation of the tasks your practice, the assessment report performed exercise
- rewarding ability to work in a team practice performing the task detailed in the laboratory,
- developed aesthetic rewarding diligence reports and tasks within their own learning.

Course description

Introduction to basic problems of electromagnetic compatibility (EMC), basic and define units. Basic concepts of electromagnetism and signal analysis. Sources, classification and characteristics of electromagnetic disturbances. Coupling mechanisms of disturbances and disturbances effects on electrical and electronic systems. The influence of electromagnetic fields on biological and technical environment. Measures and devices to reduced the effects of disturbances. Fundamentals of computer simulation of EMC problems.

Basic bibliography:

1. Machczyński W.: Wprowadzenie do kompatybilności elektromagnetycznej, Wydawnictwo Politechniki Poznańskiej, Poznań 2010.
2. Krakowski M.: Elektrotechnika teoretyczna. Tom 2, PWN, Warszawa 1995.
3. Alfa-Weka: Praktyczny poradnik. Certyfikat CE w zakresie kompatybilności elektromagnetycznej. Normy i zasady bezpieczeństwa w elektrotechnice. Tom 1-3, Alfa-Weka, Warszawa 1998-2001.

Additional bibliography:

1. Paul C. R.: Introduction to electromagnetic compatibility, Wiley, New York 2006.
2. Kaiser K. L.: Electromagnetic compatibility handbook, CRC Press, Boca Raton 2005.
3. Perez R.: Handbook of electromagnetic compatibility, Academic Press, New York 1995.
4. Tesche F. M., Ianoz M. V., Karlson T.: EMC analysis methods and computational models, Wiley, New York 1997.

Result of average student's workload

Activity	Time (working hours)
1. participation in class lectures	15
2. participation in laboratory classes	15
3. participate in the consultations on the lecture	3
4. preparation and development of laboratory reports	14
5. preparation for the colloquium lecture falling under	10
6. participate in the consultations on the lab	3

Student's workload

Source of workload	hours	ECTS
Total workload	60	2
Contact hours	36	1
Practical activities	32	1